International Journal of Surgery Case Reports 87 (2021) 106416

Contents lists available at ScienceDirect

International Journal of Surgery Case Reports

journal homepage: www.elsevier.com/locate/ijscr

Case report

Successful surgical treatment of a giant uterine leiomyoma: A case report

Akihito Yamamoto *, Shunji Suzuki

Department of Obstetrics and Gynecology, Nippon Medical School, Japan

ARTICLE INFO

Keywords:
Giant
Leiomyoma
Fibroid
Myoma
Uterus
Surgery

ABSTRACT

Introduction and importance: Uterine leiomyoma is a common disease. The tumor gradually increases and becomes a target for treatment when accompanied by certain symptoms. It rarely grows into a giant uterine leiomyoma, which is defined as leiomyoma weighing >11.34 kg.

Case presentation: A 58-year-old Japanese woman had a history of putamen hemorrhage and deep vein thrombosis. A giant uterine leiomyoma prevented her from walking, and she scheduled surgery for its removal. The tumor was 46 × 35 × 27 cm, and the uterine arteries and veins were extremely dilated. A blocking balloon catheter was placed in the abdominal aorta to prevent massive bleeding, and a filter was placed in the inferior vena cava to prevent pulmonary thromboembolism. The surgery focused on careful vascular treatment, with selective ligation of the ovarian arteries and veins and the uterine arteries. The total amount of bleeding was 1130 g, and the uterus was removed without complications. The weight of the excised tissue was 22.6 kg.

Clinical discussion: Surgical treatment of the largest giant uterine leiomyomas is rare and challenging. Previous reports addressed the risk of massive bleeding and perioperative death. Surgery is the best treatment for giant uterine leiomyomas, but perioperative management and surgical procedures require complex and elaborate planning.

Conclusion: Very few gynecologists have experience treating giant uterine leiomyomas. Successful surgery requires careful surgical preparation, and the gynecological oncologist must have extensive experience with giant leiomyomas.

1. Introduction

In 1971, Beacham et al. reviewed cases of uterine and ovarian tumors weighing more than 25 pounds (>11.34 kg) [1]. Such large ovarian tumors are common, but uterine tumors of this size are rare. Subsequently, Jonas et al. and Evans et al. described giant uterine leiomyomas of this size, stating that "giant uterine leiomyoma" is defined as a leiomyoma weighing >25 pounds (>11.34 kg) [2,3]. After these reports, giant uterine leiomyomas weighing ≥11.34 kg have been seldom reported [4–10].

Uterine leiomyomas are common, affecting approximately 70% of women at some point in their lifetime [11]. The size of leiomyomas gradually increases at an average rate of 9% every 6 months during the reproductive years, and they usually cause symptoms such as hypermenorrhea, abdominal pain, abdominal distension, and infertility. They are typically treated before they reach giant sizes [4,12]; therefore, it is extremely rare for a giant uterine leiomyoma to grow to more than 11.34 kg without intervention. Surgery is the best treatment for giant uterine leiomyoma, but perioperative management and surgical procedures require complex and elaborate planning [2,3,6,8,9,13]. There have also been reports of deaths resulting from giant uterine leiomyomas [14]. We describe the successful surgical treatment of one of the largest giant uterine leiomyomas ever reported.

This study has been reported in line with the SCARE criteria [15].

2. Presentation of case

A 58-year-old nulliparous Japanese woman was transferred to our hospital for the removal of a giant uterine leiomyoma. She had a history of putamen hemorrhage, deep vein thrombosis, and uterine fibroids. She had been aware of her abdominal mass for more than a decade, but she did not see a doctor. The patient underwent conservative treatment for the putamen hemorrhage at another hospital and seemed to improve. However, she was unable to maintain a standing position because of the

Abbreviations: CT, computed tomography.

* Corresponding author at: 1-1-5 Sendagi, Bunkyo-ku, Tokyo 113-8602, Japan.
E-mail address: s7095@nms.ac.jp (A. Yamamoto).

https://doi.org/10.1016/j.ijscr.2021.106416
Received 23 August 2021; Received in revised form 12 September 2021; Accepted 13 September 2021
Available online 16 September 2021

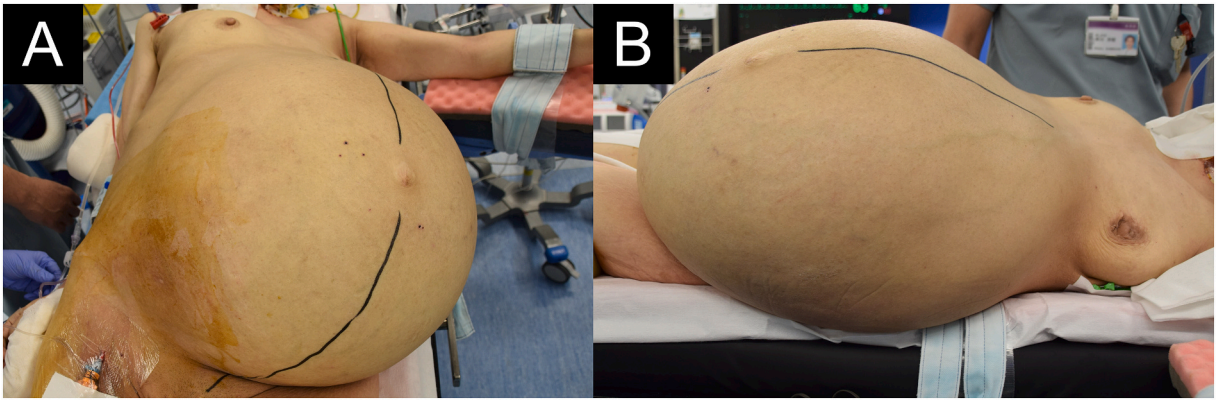

Fig. 1. Views of the abdomen. (A) Front view. (B) Side view.

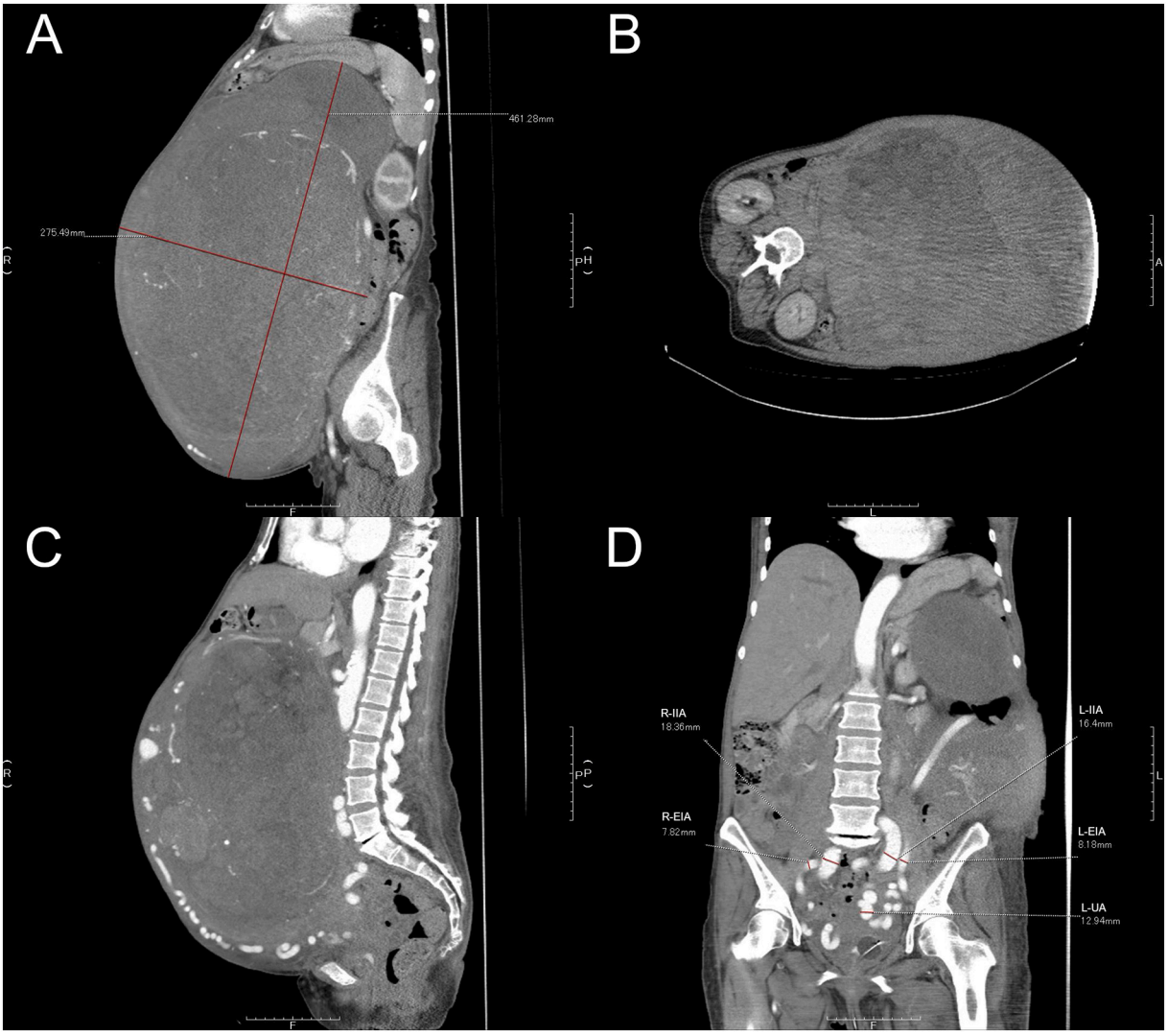

Fig. 2. Computed tomographic findings. (A) The maximum diameter of uterine leiomyoma exceeded 46 cm. (B) The giant uterine leiomyoma had prolapsed completely outside the pelvis. (C) The feeding vessels of uterine leiomyoma were very thick and irregularly distributed. (D) The internal iliac artery had a diameter more than twice that of the external iliac artery, and the diameter of the uterine artery was 1.3 cm. R-IIA, Right internal iliac artery; R-EIA, Right external iliac artery; L-IIA, Left internal iliac artery; L-EIA, left external iliac artery; L-UA, left uterine artery.

weight of the giant uterine leiomyoma—she had difficulty maintaining her position even when recumbent—and could not perform walking training. Because of the difficulties of this case, she was referred to our hospital for advanced medical care.

Her abdomen protruded greatly, and a hard mass was palpable inside (Fig. 1). Magnetic resonance imaging did not depict the mass

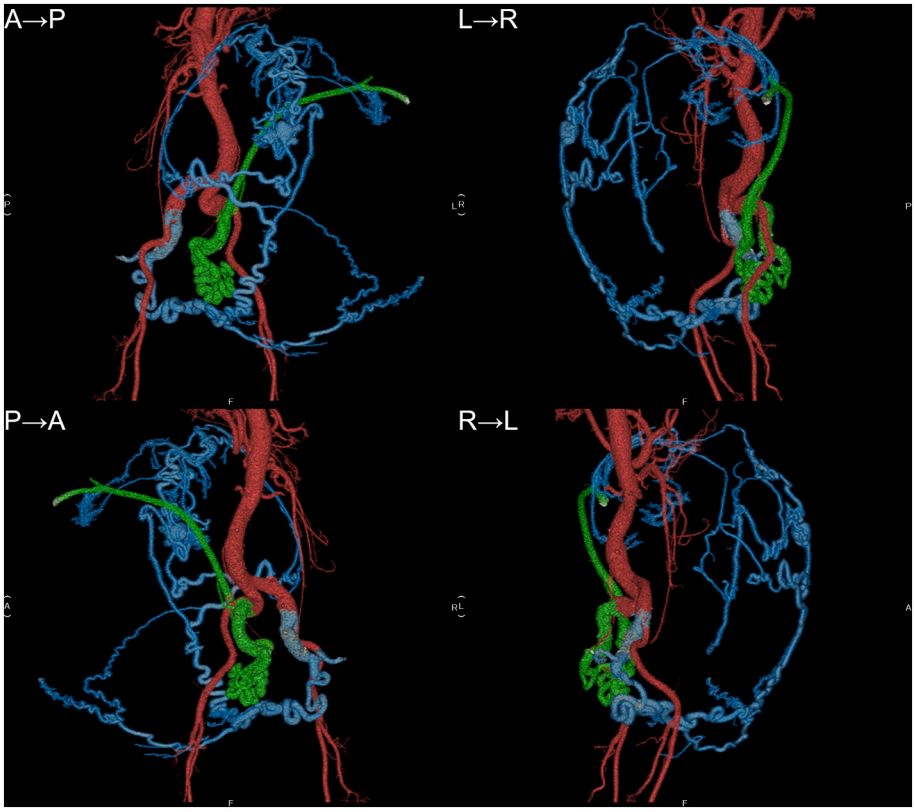

Fig. 3. Three-dimensional computed tomographic depiction of tumor feeding vessels. The distribution from the bilateral uterine arteries was confirmed. Blue vessels represent the right internal iliac artery system; green vessels represent the left internal iliac vascular system. A → P, anteroposterior image; P → A, posteroanterior image; L → R; left-to-right image; R → L; right-to-left image.

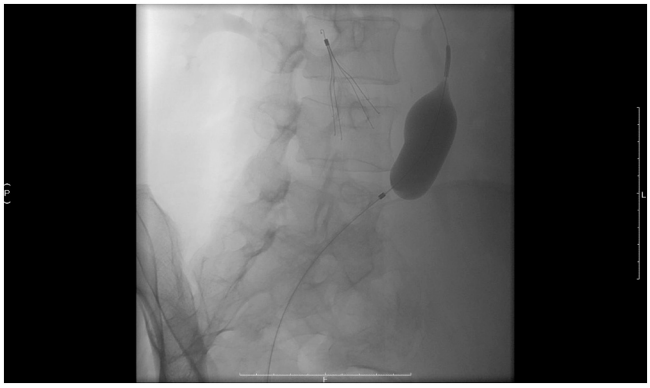

Fig. 4. Inferior vena cava filter and balloon catheter placed in the abdominal aorta.

adequately. Computed tomography (CT) revealed the mass as uterine leiomyoma, measuring 46 × 35 × 27 cm (Fig. 2A) and completely prolapsed out of the pelvis, and the center of gravity of the tumor was outside the trunk (Fig. 2B). On the cranial side, the costal cartilage was opened and deformed by the compression of the tumor. The tumor did not fit in the CT imaging range and was difficult to evaluate sufficiently. Still, it did demonstrate that the uterine arteries and veins were extremely dilated and surrounded the tumor (Fig. 2C). The diameter of the internal iliac artery was twice that of the external iliac artery, and the diameter of the uterine artery was 1.3 cm (Fig. 2D). Three-dimensional CT showed that the uterine arteries were the dominant blood vessels feeding the tumor (Fig. 3). In addition, CT showed a thrombus extending from the left external iliac vein to the femoral and popliteal veins.

Thorough preparations were made before surgery. Anticoagulant therapy was switched from warfarin to heparin and was discontinued 9 h before surgery. For blood supply, 20 U each of packed red blood cells and fresh-frozen plasma were prepared. A percutaneous cardiopulmonary support device and a clinical engineer were arranged in the operating room. A filter was placed in the patient's inferior vena cava to prevent pulmonary artery embolism caused by the movement of the thrombus, and a balloon catheter was placed in the abdominal aorta peripheral to the inferior mesenteric artery to block massive bleeding during surgery (Fig. 4). For access to blood vessels, sheath introducers were placed from the right internal vein and the right femoral artery, a triple-lumen central venous catheter was placed in the left internal vein, and peripheral vein lines were placed in both forearms.

The surgeon was a gynecologic oncologist. The surgical procedure began with careful vascularization, whereby the ovarian arteries and veins and uterine arteries were selectively ligated in sequence. Triple ligation was applied to the amputation of the uterine artery to prevent shock caused by rebleeding. Two assistants were needed to lift and fix the giant tumor, secure the surgical field, and prevent vascular rupture caused by the tumor's displacement (Fig. 5A). The operation time was 3 h and 16 min, the total blood loss was 1130 g, and the uterus was removed without complications. The excised specimen weighed 22.6 kg, and pathological examination ruled out malignant findings. The postoperative course was uneventful, and perioperative management was completed in 1 week. The patient was then able to walk and underwent rehabilitation for putamen hemorrhage.

3. Discussion

This case represented one of the largest giant uterine leiomyomas in the world. Few giant uterine leiomyomas exceeding 20 kg have been

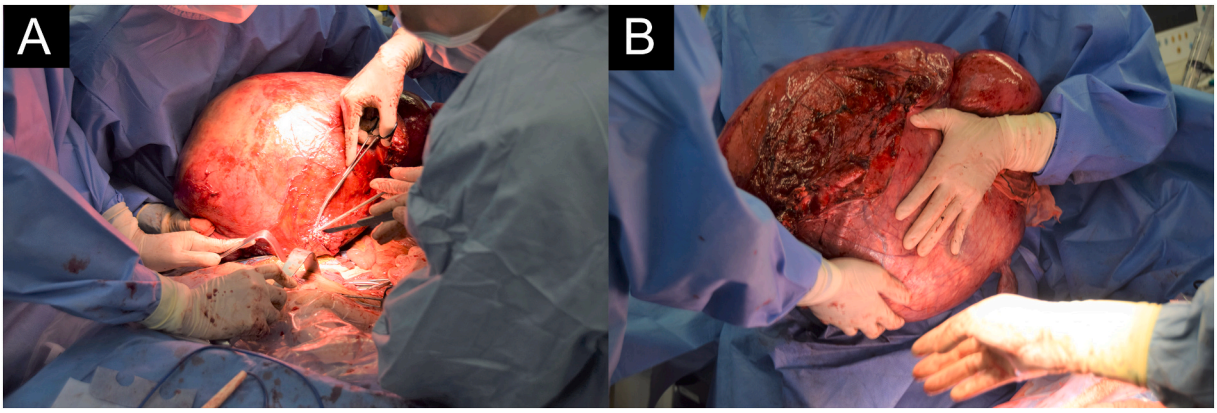

Fig. 5. Intraoperative findings. (A) Assistants supported and fixed the position of the giant tumor. (B) The uterine leiomyoma weighed 22.6 kg at the time of removal.

reported.

Perioperative complication management and careful planning of complex surgical procedures are required before surgery for giant uterine leiomyoma. Jonas et al. reported a perioperative mortality rate of 14.8%–16.7% among patients with giant uterine leiomyomas weighing more than 25 pounds (11.34 kg) [2]. Lim et al. reported a 27.8-kg giant uterine leiomyoma. Its removal resulted in 7 L of intraoperative bleeding, postoperative circulatory disorder, and abnormal coagulation [4]. Steward et al. also reported an 11.6-kg giant uterine leiomyoma that required life-saving surgery, including bilateral iliac artery ligation for diffuse intravascular coagulation caused by 2 L of intraoperative bleeding, followed by 5.0 L of intraperitoneal rebleeding, as well as mass transfusion and systemic management in the intensive care unit [5]. In addition, Amber et al. reported a 26.9-kg giant uterine leiomyoma. During surgery, 2.0 L of intraperitoneal rebleeding after 1.8 L of intraoperative bleeding caused shock despite careful preoperative examination and intraoperative vascular treatment [16]. These reports indicate the risk of massive bleeding and the difficulty of surgical procedures associated with the removal of giant uterine leiomyomas.

In planning the surgery, we investigated the feeding vessels of the tumor in detail in advance. Three-dimensional CT revealed that the dominant blood vessels were the internal iliac artery and uterine artery and that abnormal feeding vessels did not develop from the ovarian artery and other pathways. No previous report objectively showed vascular control of giant uterine leiomyomas. The result of our patient's surgery suggests that the extremely unusual surgical approach with the same strategy as a normal hysterectomy was effective. Therefore, preferential and reliable occlusion of the uterine arteries helped produce good surgical results.

Deep vein thrombosis is one of the characteristic complications for patients with uterine leiomyomas. In this case, deep vein thrombosis was observed before surgery, and an inferior vena cava filter was placed before surgery. The thrombus adhered to the filter after removal, which suggests that this treatment was effective. Fortunately, a balloon placed in the abdominal aorta did not block blood flow, and no percutaneous cardiopulmonary support was needed. Although these preparations may seem extreme, the risk of massive bleeding must be carefully considered in each case [4].

Despite careful preparation, unpredictable events such as massive bleeding, adhesions to surrounding organs, and displacement of organs can occur during surgery for giant uterine leiomyomas. Surgery should be performed by a gynecological oncologist who has extensive surgical experience for large tumors and advanced cancers and whose anatomical knowledge can accommodate irregular organ placement [4].

4. Conclusion

The number of cases of giant uterine leiomyoma is small, and many gynecologists have no treatment experience. Surgery to remove giant uterine leiomyomas carries a high risk of perioperative complications and necessitates careful preparation. In addition, a surgeon who has sufficient experience should be in charge of surgery.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Ethical approval

This work does not require a deliberation by the ethics committee.

Funding

The authors declare that they have no supportive funding.

Guarantor

Akihito Yamamoto accepts full responsibility for the work and had controlled the decision to publish.

Research registration number

Not applicable.

CRediT authorship contribution statement

AY performed the surgery on this patient, and wrote the manuscript. SS supervised the manuscript. All authors have read and approved the final manuscript.

Declaration of competing interest

The authors declare that they have no competing interests.

References

[1] W.D. Beacham, H.D. Webster, E.H. Lawson, L.M. Roth, Uterine and/or ovarian tumors weighing 25 pounds or more: a review of the literature in English since 1946, Am. J. Obstet. Gynecol. 109 (8) (1971) 1153–1161, https://doi.org/10.1016/0002-9378(71)90657-0.

[2] H.S. Jonas, B.J. Masterson, Giant uterine tumors: case report and review of the literature, Obstet. Gynecol. 50 (1 Suppl) (1977) 2s–4s.
[3] A.T. Evans, J.H. Pratt, A giant fibroid uterus, Obstet. Gynecol. 54 (3) (1979) 385–386.
[4] P.T. Lim, C.H. Tan, H.L. Chia, J. Phoon, Management of a giant uterine leiomyoma, Epub 2018/09/04, BMJ Case Rep. (2018), https://doi.org/10.1136/bcr-2017-224052. PubMed PMID: 30181399; PubMed Central PMCID: PMCPMC6129052.
[5] R.G. Steward, H.W. Denhartog, A.R. Katz, Giant uterine leiomyomata, Epub 2010/11/10, Fertil. Steril. 95 (3) (2011), https://doi.org/10.1016/j.fertnstert.2010.10.016. PubMed PMID: 21067725.
[6] G. Oelsner, S.E. Elizur, Y. Frenkel, H. Carp, Giant uterine tumors: two cases with different clinical presentations, Obstet. Gynecol. 101 (5 Part 2) (2003).
[7] F. Săvulescu, I. Iordache, O. Albiţa, R. Hristea, C. Dumitru, A. Iordache, et al., Giant uterine leiomyoma, Chirurgia (Bucur) 106 (5) (2011) 665–668.
[8] E.C. Ezugwu, C.A. Iyoke, F.O. Ezugwu, G. Ugwu, Successful pregnancy following myomectomy for giant uterine fibroid in an infertile woman, J. Reprod. Infertil. 15 (4) (2014) 233–236. PubMed PMID: 25469327; PubMed Central PMCID: PMCPMC4227982.
[9] S. Kalyan, S. Sharma, Giant uterine leiomyoma: a case report with literature review, Int. J. Reprod. Contracept. Obstet. Gynecol. 7 (11) (2018). November 2018DO - 1018203/2320-1770ijrcog20184548. 2018.
[10] W. Viva, D. Juhi, A. Kristin, M. Micaela, B. Marcus, A. Ibrahim, Massive uterine fibroid: a diagnostic dilemma: a case report and review of the literature, Epub 2021/07/13, J. Med. Case Rep. 15 (1) (2021) 344, https://doi.org/10.1186/s13256-021-02959-3. PubMed PMID: 34253260; PubMed Central PMCID: PMCPMC8276390.
[11] D.D. Baird, D.B. Dunson, M.C. Hill, D. Cousins, J.M. Schectman, High cumulative incidence of uterine leiomyoma in black and white women: ultrasound evidence, Am. J. Obstet. Gynecol. 188 (1) (2003) 100–107, https://doi.org/10.1067/mob.2003.99.
[12] S.D. Peddada, S.K. Laughlin, K. Miner, J.P. Guyon, K. Haneke, H.L. Vahdat, Growth of uterine leiomyomata among premenopausal black and white women, Epub 20081201, Proc. Natl. Acad. Sci. U. S. A. 105 (50) (2008) 19887–19892, https://doi.org/10.1073/pnas.0808188105. PubMed PMID: 19047643; PubMed Central PMCID: PMCPMC2604959.
[13] C. Aydin, S. Eriş, Y. Yalçin, H. Sen Selim, A giant cystic leiomyoma mimicking an ovarian malignancy, Epub 2013/09/13, Int. J. Surg. Case Rep. 4 (11) (2013) 1010–1012, https://doi.org/10.1016/j.ijscr.2013.08.018. PubMed PMID: 24080265; PubMed Central PMCID: PMCPMC3825977.
[14] T. Sonoo, K. Tokunaga, T. Fukuda, K. Nakamura, Cardiac arrest induced by a giant uterine leiomyoma, BMJ Case Rep. 2015 (2015), bcr2015213370, https://doi.org/10.1136/bcr-2015-213370.
[15] R.A. Agha, T. Franchi, C. Sohrabi, G. Mathew, A. Kerwan, A. Thoma, et al., The SCARE 2020 guideline: updating consensus surgical CAse REport (SCARE) guidelines, Int. J. Surg. 84 (2020) 226–230, https://doi.org/10.1016/j.ijsu.2020.10.034.
[16] I. Amber, G. Kennedy, H. Martinez, J.M. Pearson, E. Jimenez, A leiomyoma in a cachectic woman presenting as a giant abdominal mass, Epub 20091001, J. Radiol. Case Rep. 3 (10) (2009) 23–29, https://doi.org/10.3941/jrcr.v3i10.324. PubMed PMID: 22470623; PubMed Central PMCID: PMCPMC3303273.